

sation analysis during gait, at the same time reproducible and sensitive to the pathology tested in this study.

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Gait biomechanics and neurorehabilitation: Time for individualized practice?

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Keywords: Gait; Biomechanics; Hemiparesis

Introduction.— Despite the recognition of the benefits of gait analysis, appropriate examinations are thought to be too sophisticated for clinical practice. The study was conducted to test the feasibility of recently developed systems for biomechanics analysis in neurorehabilitation.

Methods.— Thirty patients (26 men) aged 55.2 ± 15.2 years with central hemiparesis were included into the study. Paresis grade averaged 3.7 ± 0.9 , Ashworth spasticity index — 1.1 ± 1.2 , Rivermead mobility index — 11.8 ± 2.9 . Gyroscopic TRUST, tension-sensing Diasled systems, stabilometric platform Balance Master, Raptor motion videoanalysis system (“gold standard”) were studied.

Results.— The following predictors of Rivermead mobility index were identified: amplitude of motion in hip and knee at the paretic (AUC 0.82 and 0.7) and the non-paretic side (AUC 0.88 and 0.72), walk asymmetry (time of the second double support, AUC 0.63). No significant differences between Raptor and TRAST results were observed. The shortness of Balance Master platform caused huge amount of false positive results. Diasled system revealed a shift of the center of mass to the non-paretic side, which resolved with treatment.

Discussion.— Portable systems for gait analysis provide clinically significant information. Their use in neurorehabilitation is feasible for the goal of physiotherapy individualization and objective assessment of rehabilitation efficacy.

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Relationship between dynamic balance and stance phases during gait in normal ageing

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Keywords: Balance; Gait; Ageing; Posturography

Introduction.— In old subjects, keeping a good balance is fundamental to maintain a functional independence. The purpose of this study was to evaluate the relationship between dynamic standing balance and single and double support phases during gait.

Method.— Twenty asymptomatic subjects over 60 years old and twenty under 60 years old participated in this study. Static balance, dynamic balance and spatiotemporal gait parameters were recorded using a WinFDM Zebris® platform. Antero-posterior (AP) and circular (Circ) dynamic balance parameters were quantified. A cognitive test (Codex) was performed in the group of older subjects. **Results.**— It has been found a change in the spatiotemporal gait parameters and balance with age. A multivariate analysis showed that most of the changes were related to an impairment of cognitive functions (Codex), but not the AP and Circ index. Relationships were found between the AP index and the percentage of double support phase ($r = -0.65$).

Discussion.— The change in spatiotemporal gait parameters and balance with age is associated with the appearance of cognitive impairments, but not with dynamic balance parameters for which impairments of proprioceptive, visual and vestibular systems could be preponderant.

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A new dynamic posturography method to quantify the quality of balance

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Keywords: Dynamic posturography; Balance evaluation

Objective.— To quantify the quality of balance in patients suffering from sensory or motor problems, using a new method of dynamic posturography.

Methods.— We compared posturography measurements of 3 groups: 8 subjects with neuropathy sensitive, 8 subjects with myopathy and 8 healthy subjects. IsiMove platform was used to measure posturography parameters. The protocol consists of 5 exercises that are repeated for five frequencies (0.1 Hz to 0.5 Hz). The exercises are applied in a sequential manner: anterior posterior tilt, mediolateral tilt, anterior posterior translation, vertical rotation and mediolateral translation. A normal range was developed with surface measurements in healthy subjects. A subject will note 5 if the value of the measured surface is in the normal range; 2 if the value is outside and 0 if he does not perform the exercise. Each subject will have a final score of quantification (the sum of scores for each exercise).

Results and discussion.— Patients with neuropathy have obtained scores between 0 and 107; patients with myopathy have obtained scores between 0 and 95, while all normal subjects have scores of 125. We chose a schematic star that can analyse the quality of balance by comparing the three groups.

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How gait parameters of the adolescents differ from the adult population. Cohort study using an accelerometer

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Introduction.— The aim of our study was to compare gait parameters of an adolescent population with the gait standardized parameters of the adult Italian population using an accelerometer.

Methods.— We used the BTS G-WALK, it uses an inertial sensor to determine spatio-temporal parameters of gait. For each adolescent data about cadence and gait cycle duration, together with other gait parameters, were collected. We excluded all those who were affected by muscle-skeletal, vestibular or neurological disease. BTS gave us the gait standardized parameters for adults.

Results.— Of the 290 adolescents, 207 (97F, 110M) were included in our analysis. Our data show that cadence and gait cycle duration seem to improve with age. The mean cadence in adolescents population was 48.6 steps/min while in the adult population is 54.30 steps/min. The mean gait cycle duration in the adolescents population was 1.25 s while in the adult population is 1.12 s.

Conclusion.— The results show an increase of cadence and reduction of gait cycle duration when the age increase. This might suggest a correlation between these parameters and muscle-skeletal development in the adolescent population.

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Reproducibility of main posturographic and gait parameters in lower limb amputees

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